Duodenal Ulcer

Gastrectomy Versus Vagotomy With Accessory Procedures

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• **Vagotomy should be added to whatever other surgical procedure is used in the treatment of duodenal ulcer. Vagotomy with pyloroplasty is the procedure of choice in most patients with duodenal ulcer. Gastroenterostomy and gastrectomy with vagotomy are procedures of necessity in certain clinical situations.**

EVER SINCE Dragstedt restored vagotomy as a surgical treatment for duodenal ulcer to a firmer physiologic and anatomic foundation, a great deal of controversial furor has been generated between the protagonists of vagotomy and those of gastrectomy. There are now signs that the tumult is subsiding and that both procedures will find their rightful places in the surgical management of benign duodenal ulcer.

Although this subject has been primarily a surgical controversy, nevertheless, it is worthwhile to present an attitude based on a purely medical experience with respect to this problem.

There are four main points for emphasis here:

1. Operation, whatever the kind, is not the answer to the problem of duodenal ulcer. It becomes an issue only when complications arise which are beyond medical control.

2. There are limitations to every surgical procedure.

3. There is a place for gastric resection, gastroenterostomy, pyloroplasty and vagotomy in the surgical treatment of duodenal ulcer.

4. The main problem which concerns the physician is the determination of which surgical procedure is the one of choice in a particular clinical situation.

It would seem that the surgical procedure of choice should have the lowest mortality, the least number of complications, the most manageable complications, and, above all, when expertly done, should be followed by the least number of ulcer recurrences. During the past eight years the authors have had extensive preoperative and postoperative medical experience with vagotomy at the Veterans Administration hospitals of Van Nuys and Long Beach, California, where the project has been under the able direction of Dr. Joseph A. Weinberg. We have become cognizant of the value as well as the limitations of vagotomy when done with an accessory operative procedure designed to facilitate gastric drainage. We believe that vagotomy with pyloroplasty is the best combination for most patients. We have not had a like experience with gastrectomy alone done as the primary procedure for duodenal ulcer. Nevertheless, we have seen many patients with complications following gastrectomy done elsewhere, and we have been able to compare this group with our group of patients who had vagotomy and subsequent complications.

An examination was made of the records of several leading clinics where a series of patients was treated by gastrectomy alone and in some instances another series was treated by vagotomy and an accessory surgical procedure (see Table 1).

The experience at the Cleveland clinic[3, 4] was that the mortality rate and the ulcer recurrence rate associated with gastrectomy were nearly three times greater than the rate for vagotomy with either pyloroplasty or gastroenterostomy. Crile's report did not mention the incidence of complications. From Wangensteen's clinic, a report by Rauch[8] showed that the most striking statistical finding was the high incidence of complications following gastrectomy—34 per cent. The mortality rate was 3.4 per cent. The ulcer recurrence rate was low, comparing favorably with Crile's vagotomy group. At the University of Michigan Hospital, the report of Pollard[7] showed no mortality in 21 cases of gastrectomy with vagotomy. The ulcer recurrence rate for this group was lower than it was for gastrectomy alone. Muir[6] in Scotland reported an unusually high incidence of complications following gastrectomy alone. Garlock and Lyons[5] likewise noted a high incidence of complications; the mortality rate of 2.1 per cent, however, was remarkably low. The ulcer recurrence rate was 3.7 per cent. In Colp's[13] series, the mortality rate and incidence of complications seemed to favor gastrectomy. However, the ulcer recurrence rate was

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TABLE 1.—*Mortality, incidence of complications and recurrence of ulcer after subtotal gastrectomy. Experience of other clinics.*

Source of Data	Number of Cases	Mortality (Per Cent)	Complications (Per Cent)	Ulcer Recurrence (Per Cent)
Crile[3, 4]	78 gastrectomy	4.1	.....	4.1
Cleveland Clinic	83 vagotomy with pyloroplasty or gastroenterostomy	1.3	.....	1.3
Wangensteen	702 gastrectomy	3.4	34.0	1.5
University of Minnesota Hospital				
Pollard and co-workers[7]	52 gastrectomy	6.1	.....	9.4
University of Michigan Hospital	21 gastrectomy with vagotomy	0.0	.....	4.7
Muir[6]	124 (cancer in 17 cases)	....	47.0	....
Western Infirmary, Glasgow				
Garlock and Lyons[5]	187	2.1	22.0	3.7
Mt. Sinai Hospital, New York				
Colp	210	0.0	9.0	5.0
Mt. Sinai Hospital, New York	155 gastrectomy with vagotomy	0.7	15.0	0.0

TABLE 2.—*Mortality, incidence of complications and recurrence of ulcer associated with vagotomy-pyloroplasty. Experience at Veterans Administration Hospital, Long Beach*

Source of Data	Number of Cases	Mortality (Per Cent)	Complications (Per Cent)	Ulcer Recurrence (Per Cent)
Weinberg	180 (followed 2 to 6 years)	0.5	5.55	2.8 (All incomplete vagotomy)
Long Beach VA Hospital				

definitely in favor of vagotomy as an added procedure. In most of these reports, the addition of vagotomy seemed to have improved the situation in one respect or another. A more recent report by Baltz[2] and associates includes this significant statement:

"This study strongly suggests that the addition of vagotomy contributes valuable protection, and we feel that this procedure should be done at the original operation and not reserved for the unfortunate patient who develops a jejunal ulcer following gastric surgery."

In contrast with the experience of other clinics (Table 1), the experience at the Veterans Administration Hospital at Long Beach with vagotomy-pyloroplasty is shown in Table 2. The outstanding features of the experience with this procedure were the low mortality rate, low complication rate and low ulcer-recurrence rate.

As a preface to evaluation of our experience with complications in the group of patients who had vagotomy-pyloroplasty, it may be noted that Allen[1] and Warren and Meadows[11] stated that the incidence of complications in patients who had gastrectomy was about the same as in those who had vagotomy with or without accessory surgical procedures, both usually being in the neighborhood of 10 per cent. However, the data on vagotomy-pyloroplasty at the VA hospital at Long Beach[12] indicate that the percentage of persistent disabling complications with this procedure is only 5.55 per cent[12] (Table 2).

A study was made of a group of 27 cases in which the patients had had subtotal gastrectomy for duodenal ulcer done elsewhere. The basis of selection was primarily the completeness of the diagnostic study which in every case included gastroscopic examination. Cases of gastrectomy for carcinoma, and for benign ulcer, were of course excluded, as were cases in which gastrectomy was combined with vagotomy. The number and the variety of complications which occurred in the group of 27 cases are shown in Table 3. The frequency of inflammatory disease noted at gastroscopy, was impressive: Seventeen cases of diffuse gastritis, six cases of peristomal gastritis and three cases of jejunitis. Recurrent ulceration was observed in seven cases, and one patient had a gastric ulcer (gastroscopically confirmed) which is a relatively rare form of recurrence. Also impressive was the number of patients who had vomiting as an outstanding complaint. The authors believe that these symptoms were related to the gastritis observed gastroscopically. Two of the more unusual complications of gastrectomy were noted in the series—an inadvertent gastroileostomy and intussusception of the jejunum through the stoma. There are, of course, other complications which are reported in the literature, and some of them eventually cause death. Complications of that kind, usually not seen on the Medical Service, include disruption or leakage of the suture line at the duodenal stump with subsequent peritonitis, injury to the pancreas and its ducts, injury to the bile ducts and postoperative

TABLE 3.—*Relative incidence of complications of subtotal gastrectomy for duodenal ulcer (27* cases studied at Veterans Administration Hospital, Long Beach)*

Gastritis, diffuse	17	Dumping syndrome	5
Gastritis, peristomal	6	Diarrhea	5
Jejunitis	3	Steatorrhea	1
Dilated afferent loop	2	Hypoglycemic reactions	3
Gastric ulcer	1	Vomiting	14
Stomal ulcer	4	Recurrent hemorrhage	8
Jejunal ulcer	2	Anemia	7
Large stoma	1	Weight loss	9
Gastroileostomy	1		
Intussusception of jejunum into stomach remnant	1		

*Gastroscopic examination performed in all 27 cases.

TABLE 4.—*Complications seen after vagotomy and pyloroplasty for duodenal ulcer in 180 cases (at the Veterans Administration Hospital, Long Beach)*

	No. of Cases*	
Cardiospasm		Transient
Gastric retention	6	Usually transient—manageable. Rarely requires surgical intervention.
Gastritis—antral	1	Rare—may be persistent.
Dumping syndrome		Transient—manageable.
Hypoglycemic reactions	2	Transient—manageable.
Diarrhea	1	May be persistent.

*The number of cases in which the complications occurred is given only when the complication persisted beyond the second postoperative year.

hemorrhage. The data in Table 4 show the lesser incidence and smaller variety of complications in a series of patients who had vagotomy and pyloroplasty. The authors have unpublished data[12] also indicating that the incidence of persistent complications after vagotomy-pyloroplasty (5.5 per cent) is less than it is when any other accessory procedure is combined with vagotomy. There are two complications that sometimes occur after vagotomy-pyloroplasty which are seldom seen following gastrectomy. These are cardiospasm and gastric retention.

The most important difference between the complications of gastrectomy and the complications of vagotomy-pyloroplasty cannot be put into statistical form. The complications of gastrectomy alone are usually much more complex and are likely to be more permanent or irreversible. In the authors' experience, they present great difficulties in management. The complications of vagotomy-pyloroplasty are fewer in number, are relatively simple to manage, are readily reversible and, with proper management, rarely persist beyond the first postoperative year. For example, Schindler[9] in a gastroscopic study of patients after various surgical procedures for peptic ulcer, concluded that postoperative gastritis is least severe and least frequent in patients having pyloroplasty instead of either gastroenterostomy or gastrectomy.

The mortality rate of less than 1 per cent in the vagotomy-pyloroplasty group[12] compares very favorably with any reported mortality rate for gastrectomy. As to the recurrence of ulcer, it has been our experience[10] that, where the vagotomy is complete, classical benign peptic ulcer does not recur. The insulin test in these situations cannot always be accepted with certainty because there are many factors which must be controlled to produce satisfactory test results. These factors are: (1) The refractory state of the early postoperative period; (2) gastric retention; (3) regurgitation from the duodenum or the stoma; (4) the level of hypoglycemia; and (5) the onset of postoperative gastritis.

From comparison of data the authors come to the belief that the surgical procedure of choice in the majority of cases of duodenal ulcer in which operation is indicated is vagotomy combined with pyloroplasty. Pyloroplasty should be performed after the modification of Wilkins.[14] In a number of patients, the pyloroplasty will not be feasible, owing to excessive inflammatory reaction, edema, scarring, stricture, adhesions and the like. In such situations, the choice lies between vagotomy combined with gastroenterostomy or vagotomy combined with gastrectomy. If the stomach has been well prepared for operation and is not dilated and atonic, the accessory procedure of choice is gastroenterostomy. If these conditions cannot be met, then gastrectomy combined with vagotomy is more suitable. Bleeding may also present special problems. If a patient with bleeding ulcer can be improved enough by conservative management so that operation can be done electively, then vagotomy-pyloroplasty may be sufficient. However, if the surgical approach is in the nature of an emergency, then, of course, suitable procedures should be done to control hemorrhage, such as suture-ligation of bleeding vessels, followed by vagotomy with either pyloroplasty, gastroenterostomy, or gastric resection, whichever meets the clinical situation best. If nothing is done to the ulcer bed because bleeding is not seen at operation, there is a calculated risk of additional bleeding postoperatively, even if the vagotomy is adequate. This may be due to an alteration in hemodynamic factors incident to the operation. Control of bleeding by vagotomy depends largely upon the initiation of rapid healing. In perforated ulcers, it is usually better to delay definitive operation until the emergency situation has been properly handled.

It seems to us that the whole controversy of gastrectomy versus vagotomy with accessory surgical procedures is pointless. Since experience[10] has shown that complete vagotomy is the only insurance against the recurrence of ulcer, it follows that this procedure should be done with whatever other accessory sur-

gical procedure is adequate to meet the clinical situation at hand. If ulcer occurs after vagotomy, a safe assumption is that vagotomy is incomplete.[10] In such a situation, if reoperation is indicated an attempt should be made to complete the vagotomy. However, it sometimes happens that vagus fibers cannot be identified at the hiatus because of adhesions, or the clinical situation may not permit extensive exploration for vagal fibers. In such circumstances, gastrectomy is the only alternative.

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